

REMARKS

Claims 1, 6 – 12, and 14 are now pending in the application. Claims 1, 6, 9 and 11-13 have been amended. Basis for the amendments can be found throughout the specification, claims and drawings filed. Claims 3 – 5 and 10 have been canceled. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

REJECTION UNDER 35 U.S.C. § 103

Claims 1-12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Sato et al (U.S. Pub. No. 2003/0058786) in view of Bickford (U.S. Pat. No. 4,083,009) in further view of Wright (U.S. Pat. No. 5809083) in further view of Todd (U.S. Pat. No. 6,002,672). Additionally, claims 9, 10, and 11 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Sato et al (U.S. Pub. No. 2003/0058786) in view of Bickford (U.S. Pat. No. 4,083,009) in further view of Wright (U.S. Pat. No. 5,809,083). This rejection is respectfully traversed.

The present invention relates to an Orthogonal Frequency Division Multiplexing (OFDM) communication system and receiver-transmitters for use in the system as a base terminal and a mobile terminal. Each of a base terminal and a mobile terminal include a pair of antenna, a horizontal polarization antenna and a vertical polarization antenna. By using horizontally polarized and vertically polarized waves, interference between signals are avoided when same signals are sent using the same sub-carrier frequencies. In the mobile terminal, signals received through the horizontal polarization antenna are FFT-processed by an FFT-processor, and the phase of the signals is

adjusted by a phase adjuster. Likewise, signals received through the vertical polarization antenna are FFT-processed by an FFT-processor, and the phase of the signals is adjusted by a second phase adjuster. The respective phase-adjusted data signals are synthesized by a sub-carrier synthesizer, then the synthesized data signals are demodulated by a demodulator. In other words, both signals communicated between the horizontal polarization antennas and between the vertical polarization antennas are respectively phase-adjusted.

Referring to the transmitter-receiver of the base terminal, signals are received by both the horizontal polarization antenna and the vertical polarization antenna. The OFDM signals are RF processed, guard signals of each signal are removed and then the signals are FFT-processed. FFT-processed signals are fed to a signal level detector. The signal level detector compares both outputs from the FFT-processor for each sub-carrier and determines which one of the output levels is higher. The FFT processed signals are also fed into phase adjusters to adjust the signal phase. Phase adjuster outputs are fed to a selector that selects one of the outputs having a higher level according to the signal level detector. The selected outputs are then synthesized by a sub-carrier synthesizer. The synthesized carrier phase is then demodulated by a demodulator.

At the outset, Applicant respectfully refers the Examiner to the Manual of Patent Examining Procedure (MPEP) (Section 2143.03) which specifically states "[t]o establish *prima facie* obviousness of the claimed invention, all the claim limitations must be taught or suggested by prior art." Section 2143.03 of the MPEP further states that "all words in a claim must be considered in judging the patentability of that claim against the prior

art." *In Re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA1970). Applicant respectfully suggests that the Examiner has not met this requirement and further respectfully suggests that the art cited by the Examiner fails to teach or suggest independent claims 1, 6, and 9–12.

Claim 1 is amended to further distinguish the present invention from the cited references. With respect to claim 1, claim 1 has been amended to include a sub-carrier synthesizer for synthesizing the selected sub-carriers, and the demodulator demodulates the synthesized sub-carrier, wherein the first OFDM signals transmitted from the first horizontal polarization antenna and the second OFDM signals transmitted from the first vertical polarization antenna are the same signals. The sub-carrier synthesizer (120) is shown in FIGS 1 and 3, and described in the specification, page 14, lines 12-14. None of the references cited teach, mention or disclose the amended elements along other recited elements as stated in claim 1.

The primary reference, Sato, appears to disclose that three branches (antennas 1-3) receive OFDM signals and that a branch having the highest performance is selected by the selector identifying the branch that generates an output having a maximum amplitude or the maximum power synthesized from a plurality of line spectra of the first input signal A. However, in Sato, the branch having the highest performance is not selected for each sub-carrier. Para 0065. In Sato, the branch having the highest performance is selected. Moreover, Sato does not mention that the sub-carriers received by the branch having the highest performance are synthesized.

The Examiner cites Bickford as disclosing a communication system having horizontal and vertical antennas. However, nothing about the OFDM communication

system which is the subject of the present invention is touched upon. More specifically, Bickford does not disclose the use of horizontal and vertical antennas as recited in claim 1. Additionally, other cited references have nothing to do with the present invention. Therefore, Applicants respectfully request that the Examiner withdraw and reconsider this rejection.

The Examiner cites Wright as disclosing transmission and reception of data and pilot signals. Wright simply states a general purpose for using pilot signals. Col. 2, lines 5-17. Even more, Wright discloses how to detect pilot words in a data stream. Wright, however, does not disclose pilot signals that are included in first OFDM signals and second OFDM signals positioned at sub-carrier positions, where the sub-carrier positions are common to both of the OFDM signals and the OFDM signals are received from a horizontal polarization antenna and a vertical polarization antenna. Additionally, Wright does not teach, mention or disclose a sub-carrier synthesizer for synthesizing selected sub-carriers, and the demodulator demodulates the synthesized sub-carrier, wherein the first OFDM signals transmitted from the first horizontal polarization antenna and the second OFDM signals transmitted from the first vertical polarization antenna are the same signals. Therefore, Applicant respectfully requests the Examiner to reconsider and withdraw the rejection.

Additionally, the Examiner affirms that the Sato, Bickford and Wright references do not disclose the combined teaching of a first transmitter-receiver having a signal level detector for comparing a signal level receiver by the first horizontal polarization antenna with a signals level received by the first vertical polarization antenna for each sub-carrier after signals received by the both of the first antennas are FFT-processed

and for determining which one of the signal levels is higher than the other, and means for selecting either the first horizontal polarization antenna or the first vertical polarization antenna based on the determination of the signal level detector, so that the data signals for each sub-carrier are transmitted from the selected antenna which is determined to have a higher signal level. More specifically, Sato, Bickford and Wright do not teach, mention, or suggest the combination of the elements cited in claim 1.

The Examiner cites Todd as disclosing the above mentioned combination of elements. Todd relates to a diversity selection process for an antenna. The process includes testing the reception of a pair of antennas during a period when a terminal having the pair of antennas is transmitting and testing the reception of a different channel during an idle period when the terminal is neither transmitting nor receiving. Todd further discloses measuring a received signal's strength and sending a message to a demodulator and a baseband interface block indicating the received signal's strength. Col 4, lines 18-30. This is very different from the Applicant's invention. Todd is not related to an OFDM communication system. Additionally, Todd does not disclose, teach or mention the first OFDM signals transmitted from the first horizontal polarization antenna and the second OFDM signals transmitted from the first vertical polarization antenna are the same signals, a second transmitter-receiver having a signal level detector for detecting which signal level is higher is the signals received by the second horizontal polarization antenna or in the signals received by the second vertical polarization antenna; a selector for selecting signals having a higher signal level for each sub-carrier based on detecting results of the signal level detector; a sub-carrier synthesizer for synthesizing the selected sub-carriers; and a demodulator demodulates

synthesized sub-carriers. Therefore, Todd does not teach, disclose or suggest the above-mentioned elements along with other recited elements in claim 1.

Even more, Todd does not disclose, teach or suggest a sub-carrier synthesizer for synthesizing the selected sub-carriers, and the demodulator demodulates the synthesized sub-carrier, wherein the first OFDM signals transmitted from the first horizontal polarization antenna and the second OFDM signals transmitted from the first vertical polarization antenna are the same signals as cited in claim 1. Thus, Applicants respectfully request that the Examiner withdraw and reconsider this rejection.

Applicants canceled claims 3, 4, 10 and 13; thus, this rejection is moot.

Based on the arguments, Applicant respectfully submits the arguments made above apply equally with respect to claims 1, 6 and 9 –12. Likewise, the arguments made above regarding deficiencies in the art cited by the Examiner apply equally to claims 5, 7-8, and 14. In view of the foregoing, Applicant respectfully submits that claims 1, 6, 9 and 11-12 define over the art cited by the Examiner. Likewise, claims 5, 7-8, and 14 also define over the art cited by the Examiner.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner

believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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